REMARKS

The Examiner objected to the drawings.

The Examiner indicated that claims 10-11, 20, 24-25, 29-31 and 33 are allowed.

The Examiner rejected claims 21-22 and 27 under 35 U.S.C. §112, first paragraph.

The Examiner rejected claims 1-4, 6, 8 and 34 under 35 U.S.C. §103 (a) as allegedly being unpatentable over Inoue et al. (US Pat. 6,407,442) previously applied, in view of Ting (US Pat. 5,838,032) previously applied.

The Examiner rejected claims 1-4, 6, 32 and 34 under 35 U.S.C. §103(a) as allegedly being unpatentable over Natsume (US Pat. 5,356,826) previously applied, in view of Ting (US Pat. 5,838,032).

Applicants respectfully traverse the drawings objections, and the §112 and §103 rejections, with the following arguments.

Drawings Objections

The Examiner objected to the drawings, alleging that "the limitation in claim 2 must be shown or the feature(s) canceled from the claim(s)."

Since claim 2 has been canceled, Applicants maintain that the drawings objections is moot.

35 U.S.C. §112, First Paragraph

The Examiner rejected claims 21-22 and 27 under 35 U.S.C. §112, first paragraph.

Since claims 21-22 and 27 have been canceled, Applicants maintain that the rejection of claims 21-22 and 27 under 35 U.S.C. §112, first paragraph is moot.

35 U.S.C. §103(a): Inoue in View of Ting

The Examiner rejected claims 1-4, 6, 8, and 34 under 35 U.S.C. §103 (a) as allegedly being unpatentable over Inoue et al. (US Pat. 6,407,442) previously applied, in view of Ting (US Pat. 5,838,032) previously applied.

Since claims 2-3 have been canceled, Applicants maintain that the rejection of claims 2-3 over Inoue in view of Ting under 35 U.S.C. §103(a) is moot.

Applicants respectfully contend that claim 1 is not unpatentable over Inoue in view of Ting, because Inoue in view of Ting does not teach or suggest each and every feature of claim 1. For example, Inoue in view of Ting does not teach or suggest the feature "said Fin structure including a single-crystal semiconductor material".

The Examiner argues that "Inoue et al. does not disclose the Fin structure including a single-crystal semiconductor material. However, Ting discloses that the lower electrode (23) can be formed of single-crystal semiconductor material (see col. 4, lines 42-44). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to select single-crystal semiconductor material as known materials, as taught by Ting into the device of Inoue et al. to form the lower electrode with good conductor which provide the known purpose of increasing the capacitance of the capacitor. Moreover, selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co., Inc. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945)."

In response, the Examiner has not provided a persuasive argument for modifying Inoue by the alleged teaching of Ting.

A first reason why the Examiner has not provided a persuasive argument for modifying Inoue by the alleged teaching of Ting is that the Examiner incorrectly assumes that choice of conductor material of the capacitor electrode (i.e., fin 103 in FIG. 2 of Inoue) affects the capacitance of the capacitor in Inoue. To illustrate, the capacitance of a parallel plate capacitor is $K\epsilon_0 A/d$, wherein K=dielectric constant of the dielectric material between the capacitor plate, A = surface area of capacitor plate, d = distance between capacitor plates, and ϵ_0 = permitivity of free sace. See Sears, W.S., "Electricity and Magnetism", page 200 (Equation (8-8)), Addison-Wesley Publishing Company, Inc., Tenth Printing (1956). The preceding equation shows that the capacitance of the parallel plate capacitor is independent of the electrical conductivity of the conductive material comprised by the capacitor plates. The Examiner has not provided any evidence from the prior art demonstrating that the capacitance of the fin 103 in FIG. 2 of Inoue is affected by the choice of conductive material of the fin 103. Thus, the Examiner's argument appears to be in violation of the fundamental physics of capacitors.

A second reason why the Examiner has not provided a persuasive argument for modifying Inoue by the alleged teaching of Ting is that the Examiner has not provided any evidence from the prior art demonstrating that it is known to choose the conductive material of a capacitor electrode for the purpose of increasing the capacitance of a capacitor. Such evidence does not exist in Inoue or Ting. Applicant particularly notes that Ting does not disclose use of single-crystal semiconductor material for the purpose of increasing the capacitance of the capacitor. Indeed, the use of single-crystal semiconductor material in Ting is specific to the "electrical isolation of the capacitor ... achieved through array through the use of PN junctions rather than field oxide. In such a case the common lower electrode comprises single crystalline

silicon rather than polycrystalline silicon" (Ting, col. 4, lines 40-44). In summary, the Examiner has not provided any evidence demonstrating that it is known in the prior art to choose the conductive material of a capacitor electrode for the purpose of increasing the capacitance of a capacitor.

A third reason why the Examiner has not provided a persuasive argument for modifying Inoue by the alleged teaching of Ting is that the Examiner has not provided any evidence or analysis to demonstrate that increasing the capacitance of the capacitor in Inoue would be of benefit to the device disclosed by Inoue.

A fourth reason why the Examiner has not provided a persuasive argument for modifying Inoue by the alleged teaching of Ting is that the Examiner's argument relating to "selection of a known material based on its suitability for its intended use" is misplaced. In particular, the Examiner has not demonstrated that the prior art teaches that an intended use of single-crystal semiconductor material in a capacitor electrode is to increase the capacitance of a capacitor.

Based on the preceding arguments, Applicants respectfully maintain that claim 1 is not unpatentable over Inoue in view of Ting, and that claim 1 is in condition for allowance. Since claims 4, 6, 8, 32, and 34 depend from claim1, Applicants contend that claims 2-4, 8 and 34 are likewise in condition for allowance.

In addition with respect to claim 6, Applicants respectfully contend that Inoue in view of Ting does not teach or suggest the feature: "wherein the Fin structure has a height between 10 nm and 160 nm."

The Examiner argues: "With respect to claim 6, Inoue et al. does not teach the exact

height range of their Fin structure, as claimed by Applicant. However, the height range would have been obvious to an ordinary artisan practicing the invention because, absent evidence of disclosure of criticality for the range giving unexpected results, it is not inventive to discover optimal or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955)."

In response, Applicant cites *In re Antonie*, 559 F.2d 618, 619, 195 U.S.P.Q. 6, 8 (C.C.P.A. 1977) which held that varying a variable to optimize a result is obvious only if the prior art has disclosed that the variable is a result effective variable for optimizing the result. In application to claim 6, the Examiner has not provided any evidence from the prior art demonstrating that height of the fin structure of Inoue is a result effective variable for optimizing a result of interest to Inoue. Therefore, the Examiner's argument for modifying Inoue by the height range of the fin structure recited in claim 6 is not persuasive.

In addition with respect to claim 34, Applicants respectfully contend that Inoue in view of Ting does not teach or suggest the feature: "wherein the thickness of the Fin structure is greater than 40 nm."

The Examiner argues that Ting teaches the preceding feature of claim 34. However, the Examiner has not provided an argument as to why it is obvious to modify Inoue by the alleged teaching in Ting of the thickness of the Fin structure. Therefore, the Examiner has not established a *prima facie* case of obviousness in relation to claim 34.

35 U.S.C. §103(a): Natsume in View of Ting

The Examiner rejected claims 1-4, 6, 32 and 34 under 35 U.S.C. §103(a) as allegedly being unpatentable over Natsume (US Pat. 5,356,826) previously applied, in view of Ting (US Pat. 5,838,032).

Since claims 2-3 have been canceled, Applicants maintain that the rejection of claims 2-3 over Natsume in view of Ting under 35 U.S.C. §103(a) is moot.

Applicants respectfully contend that claim 1 is not unpatentable over Natsume in view of Ting, because Natsume in view of Ting does not teach or suggest each and every feature of claim 1. For example, Natsume in view of Ting does not teach or suggest the feature "said Fin structure including a single-crystal semiconductor material".

The Examiner argues that "Natsume et al. does not disclose the Fin structure including a single-crystal semiconductor material. However, Ting discloses that the lower electrode (23) can be formed of single-crystal semiconductor material (see col. 4, lines 42-44). Therefore, it would have been obvious to one having skill in the art at the time the invention was made to select single-crystal semiconductor material as known materials, as taught by Ting into the device of Natsume et al. to form the lower electrode with good conductor which provide the known purpose of increasing the capacitance of the capacitor. Moreover, selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co., Inc. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945)."

In response, the Examiner has not provided a persuasive argument for modifying Natsume by the alleged teaching of Ting.

A first reason why the Examiner has not provided a persuasive argument for modifying Natsume by the alleged teaching of Ting is that the Examiner incorrectly assumes that choice of conductor material of the capacitor electrode (i.e., fin L1 in FIG. 2 of Natsume) affects the capacitance of the capacitor in Natsume. To illustrate, the capacitance of a parallel plate capacitor is $K\epsilon_0 A/d$, wherein K=dielectric constant of the dielectric material between the capacitor plate, A = surface area of capacitor plate, d = distance between capacitor plates, and ϵ_0 = permitivity of free sace. See Sears, W.S., "Electricity and Magnetism", page 200 (Equation (8-8)), Addison-Wesley Publishing Company, Inc., Tenth Printing (1956). The preceding equation shows that the capacitance of the parallel plate capacitor is independent of the electrical conductivity of the conductive material comprised by the capacitor plates. The Examiner has not provided any evidence from the prior art demonstrating that the capacitance of the fin L1 in FIG. 12 of Natsume is affected by the choice of conductive material of the fin L1. Thus, the Examiner's argument appears to be in violation of the fundamental physics of capacitors.

A second reason why the Examiner has not provided a persuasive argument for modifying Natsume by the alleged teaching of Ting is that the Examiner has not provided any evidence from the prior art demonstrating that it is known to choose the conductive material of a capacitor electrode for the purpose of increasing the capacitance of a capacitor. Such evidence does not exist in Natsume or Ting. Applicant particularly notes that Ting does not disclose use of single-crystal semiconductor material for the purpose of increasing the capacitance of the capacitor. Indeed, the use of single-crystal semiconductor material in Ting is specific to the "electrical isolation of the capacitor ... achieved through array through the use of PN junctions rather than field oxide. In such a case the common lower electrode comprises single crystalline

silicon rather than polycrystalline silicon" (Ting, col. 4, lines 40-44). In summary, the Examiner has not provided any evidence demonstrating that it is known in the prior art to choose the conductive material of a capacitor electrode for the purpose of increasing the capacitance of a capacitor.

A third reason why the Examiner has not provided a persuasive argument for modifying Natsume by the alleged teaching of Ting is that the Examiner has not provided any evidence or analysis to demonstrate that increasing the capacitance of the capacitor in Natsume would be of benefit to the device disclosed by Natsume.

A fourth reason why the Examiner has not provided a persuasive argument for modifying Natsume by the alleged teaching of Ting is that the Examiner's argument relating to "selection of a known material based on its suitability for its intended use" is misplaced. In particular, the Examiner has not demonstrated that the prior art teaches that an intended use of single-crystal semiconductor material in a capacitor electrode is to increase the capacitance of a capacitor.

Based on the preceding arguments, Applicants respectfully maintain that claim 1 is not unpatentable over Natsume in view of Ting, and that claim 1 is in condition for allowance. Since claims 4, 6, 32 and 34 depend from claim 1, Applicants contend that claims 4, 6, 32 and 34 are likewise in condition for allowance.

In addition with respect to claim 6, Applicants respectfully contend that Natsume in view of Ting does not teach or suggest the feature: "wherein the Fin structure has a height between 10 nm and 160 nm."

The Examiner argues: "With respect to claim 6, Natsume et al. does not teach the exact

height range of their Fin structure, as claimed by Applicant. However, the height range would have been obvious to an ordinary artisan practicing the invention because, absent evidence of disclosure of criticality for the range giving unexpected results, it is not inventive to discover optimal or workable ranges by routine experimentation. *In re Aller*, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955)."

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In addition with respect to claim 32, Applicants respectfully contend that Inoue in view of Ting does not teach or suggest the feature: "an insulation film on the first side surface of the Fin structure and in **direct mechanical contact** with the first side surface of the Fin structure" (emphasis added).

The Examiner argues that in FIG. 12 of Natsume, L1 represents the fin structure and reference numeral 8 represents the insulation film. Applicants contend that FIGS. 11 and 12 of Natsume shows that the insulation film 8 is above the fin structure L1 and not in direct mechanical contact with any surface of the fin structure L1. Indeed, the insulator structure 1 physically separates the insulation film 8 from the fin structure L1.

In addition with respect to claim 34, Applicants respectfully contend that Inoue in view of Ting does not teach or suggest the feature: "wherein the thickness of the Fin structure is greater than 40 nm."

The Examiner argues that Ting teaches the preceding feature of claim 34. However, the Examiner has not provided an argument as to why it is obvious to modify Natsume by the alleged teaching in Ting of the thickness of the Fin structure. Therefore, the Examiner has not established a *prima facie* case of obviousness in relation to claim 34.

CONCLUSION

Based on the preceding arguments, Applicants respectfully believe that all pending claims and the entire application meet the acceptance criteria for allowance and therefore request favorable action. If the Examiner believes that anything further would be helpful to place the application in better condition for allowance, Applicants invites the Examiner to contact Applicants' representative at the telephone number listed below. The Director is hereby authorized to charge and/or credit Deposit Account 09-0456.

Date: 2/11/2005

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